

We Claim:

1. A method of producing a crystalline solid-state layer by chemical vapor deposition, which comprises:

providing a substrate having a surface in a reaction space;

performing chemical vapor deposition by introducing, into the reaction space, starting gases containing elements of a solid-state layer to be deposited on the surface of the substrate and introducing, into the reaction space, at least one auxiliary substance; and

providing the auxiliary substance in a form containing molecules which have a dipole moment and which have a property of briefly attaching themselves, during a deposition process, to the surface of the substrate with a dipole moment that is perpendicular to the surface of the substrate in order to dictate a crystal structure of the solid-state layer.
2. The method according to claim 1, wherein the step of introducing the auxiliary substance includes feeding the auxiliary substance into the reaction space from an external supply source.
3. The method according to claim 2, which comprises providing the external supply source as a storage container.

4. The method according to claim 1, which comprises:

pumping reaction products away from the reaction space during the chemical vapor deposition; and

providing the auxiliary substance to essentially include the reaction products.

5. The method according to claim 1, which comprises providing the solid-state layer as a layer selected from the group consisting of a ferroelectric layer and a paraelectric layer.

6. The method according to claim 5, which comprises providing the solid-state layer with a Perovskite structure.

7. The method according to claim 1, which comprises:

providing the reaction space as an interior space of a reactor chamber;

providing a distributor plate in the interior space of the reactor chamber;

providing the reactor chamber with a reactor wall having a first side that is formed with inlet openings communicating with the interior space;

performing the step of introducing the starting gasses and the auxiliary substance by introducing the starting gasses and the auxiliary substance through the inlet openings;

providing the reactor wall with second side at which the substrate is mounted;

providing the reactor chamber with a gas outlet; and

pumping away reaction products through the gas outlet.

8. The method according to claim 7, which comprises providing the distributor plate as a perforated plate.

9. The method according to claim 7, which comprises introducing a carrier gas through the inlet openings.

10. The method according to claim 7, which comprises:

providing the reactor chamber with a further gas outlet opening formed in the reactor wall downstream of the substrate; and

providing a connecting line connecting the gas outlet opening to one of the inlet openings that is located downstream of the distributor plate.

11. The method according to claim 10, which comprises configuring, in the connecting line, a valve for controlling gas flow.